BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 91-4-E - ORDER NO. 91-819

SEPTEMBER 30, 1991

IN RE: Adjustment of Base Rates for Fuel Costs for Carolina Power and Light Company.	)))	ORDER APPROVING BASE RATES FOR FUEL COSTS

This matter is before the Public Service Commission of South Carolina (the Commission) on the review of the cost of fuel used in electric generation by Carolina Power and Light Company (CP&L or the Company) to provide service to its South Carolina retail electric customers. The procedure followed by the Commission, as set forth in S.C. Code Ann. §58-27-865 (Supp. 1990), provides for a six month review of an electric utility's fuel costs. The review in this case is from April 1991 through September 1991.[1]

At the hearing beginning September 17, 1991, William F. Austin, Esquire, Robert W. Kaylor, Esquire, and Len S. Anthony, Esquire, represented the Company; Francis P. Mood, Esquire, and Garrett A. Stone, Esquire, represented the Intervenor Nucor Steel, a Division of Nucor Corporation (Nucor); Nancy J. Vaughn, Esquire, represented the Intervenor the Consumer Advocate for the

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1. At the prior hearing in March 1991, the parties stipulated that testimony relating to outages dated August 16, 1990, September 27, 1990, and October 12, 1990, at Brunswick Unit 2 would be considered at the September 1991 hearing.

State of South Carolina (the Consumer Advocate); and Gayle B. Nichols, Staff Counsel, represented the Commission Staff (Staff). The record before the Commission consists of the testimony of three witnesses on behalf of the Company, two witnesses on behalf of Nucor, three witnesses on behalf of the Commission Staff (Staff), and 26 exhibits.[2]

Based upon a thorough consideration of the evidence in the record and the applicable law, the Commission makes the following findings of fact and conclusions of law.

FINDINGS OF FACT

1. The record of this proceeding indicates that for the period from February 1991 through July 1991, the Company's actual total fuel costs for its electric operations amounted to $276,835,610.[3] Hearing Exhibit 28. This figure was uncontroverted.[4]

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2. Upon agreement of the parties, CP&L did not present witness L.L. Yarger and the Staff did not present witness Jacqueline R. Cherry. The pre-filed testimony of these two witnesses was, however, placed in the record and their exhibits were admitted as Hearing Exhibits 1 and 28, respectively.

3. Because information concerning outages during the period under review in the hearing is not available until approximately two months after the hearing, the Commission considers the information from the two months prior to the hearing period and the following four months.

4. CP&L witness Dale M. Bouldin admitted that the Company's actual cumulative over-recovery as of the month of August 1991 was $489,000, instead of its projected under-recovery of $750,150 for the same month. The Commission has not used the actual figure because the energy sales and fuel costs for August 1991 have not been audited by the Staff. The Staff will audit and the Commission will consider the actual August and September 1991 energy sales and fuel costs in the next proceeding.

2. Staff witness A. R. Watts reviewed and compiled a percentage generation mix statistical sheet for the Company's fossil, nuclear, and hydroelectric plants for February 1991 through July 1991. The fossil generation ranged from a high of 78% in April 1991 to a low of 41% in June 1991. The nuclear generation ranged from a high of 57% in June 1991 to a low of 18% in April 1991. The percentage of generation by hydro ranged from 1% to 4% for this period. Hearing Exhibit 29.

3. Staff witness Watts considered the fossil unit outage report submitted by the Company and found no problem areas. The equivalent availability of the Company's fossil system was approximately 87.3% during the period from February 1991 through July 1991.

4. According to Company witness Coats, the Company's nuclear system operated at a capacity factor of 66.6% for the six month period and provided 8.8 billion kilowatt-hours of generation. This represented 43.8% of the Company's generation for the period. During the period, Brunswick Unit 1 achieved a capacity factor of 55.2%, Brunswick Unit 2 achieved a capacity factor of 76.3%, Harris Unit 1 achieved a capacity factor of 57.0%, and Robinson Unit 2 achieved a capacity factor of 80.6%.[5]

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5. Brunswick Unit 1, Robinson Unit 2, and Harris Unit 1 were out of service for scheduled refuelings and other maintenance during a portion of this period.

The Commission recognizes that CP&L changed its Maximum Dependable Capability (MDC) factors for its nuclear units in August 1991, effective January 1991. The change in the Company's MDC consequently affected its capacity factors for its nuclear units.

5. During the period from February 1991 through July 1991 coal suppliers delivered 4,087,085.07 tons of coal at a weighted average received cost per ton of $47.27. The Staff's audit of the Company's actual fuel procurement activities by Staff witness Jacqueline Cherry demonstrated that the average monthly received cost per ton varied from $51.23 in February 1991 to $44.92 in March 1991.

6. Company witness Larry L. Yarger testified that the Company's fuel procurement practices and procedures were reasonable. The Staff conducted an extensive review and audit of the Company's fuel purchasing practices and procedures for the subject period. The Staff's accounting witness, Jacqueline R. Cherry, testified that the Company's fuel costs were supported by the Company's books and records.

7. The record of this proceeding indicates that a comparison of the Company's fuel revenues and expenses for the period February 1991 through July 1991 produces an under-recovery of $255,880. After taking into consideration a projected under-recovery of $662,527 for the month of August 1991 and an over-recovery of $653,153 for the month of September 1991, and the Commission's disallowance of $168,257 from Order No. 91-636 (August 6, 1991),[6] the cumulative under-recovery is $96,997.

8. The Company projected that its fuel costs and system sales for October 1991 through April 1992 would yield an average

6. Order No. 91-636, issued in Docket No. 91-3-E, addressed the Company's last fuel proceeding.

cost per kilowatt-hour of 1.401 cents. Adding to this the expected under-recovery as of the end of September 1991, and divided by the projected South Carolina retail kilowatt-hour sales during this same period, produces a base fuel component of 1.404 cents. However, Company witness Bouldin testified that he recommended the Commission continue the current fuel factor of 1.475 cents for the October 1991 through March 1992 period. Bouldin explained that the Company's projections indicated that if the fuel factor were lowered in this proceeding, the factor would need to be increased to 1.585 for the period April 1992 through September 1992. Bouldin explained that his 1.475 cent recommendation was in the interest of rate stability.

9. Nucor witness Dennis W. Goins recommended that if the Commission allowed the Company to recover all of its fuel costs for the period March 1991 through September 1991, the base fuel factor should be set at 1.400 cents per kilowatt-hour. Goins testified, however, that if the Commission were to accept Nucor's recommended disallowance of $3,687,199, then it should reduce the base fuel factor to 1.275 cents to eliminate the Company's estimated over-recovery. Goins also recommended that the Commission consider limiting the consideration of nuclear imprudence to every other six month review proceeding.

10. Staff witness A. R. Watts testified that additional expenses of $73,120 should be added to the Company's fuel cost projections for the six months ending March 1992. Watts explained that CP&L's projections included the estimated fuel costs

associated with the Company's contract for the purchase of fuel from Duke Power Company (Duke). Watts testified that CP&L's Schedule J contract for the purchase of this energy from Duke had not been approved by the Federal Energy Regulatory Commission (FERC) and that it was questionable if the contract would go into effect in January 1992 as proposed.[7] Watts testified that, including Staff's recommended disallowance of $2,416,387 and without the Duke purchase amount of $73,120, the Company's average projected fuel expense for the period October 1991 through March 1992 was 1.319 cents per kilowatt-hour. Watts testified that he recommended the base fuel factor be lowered from the current 1.475 cents to 1.400 cents for October 1991 through March 1992. Watts explained that his recommendation would produce an estimated over-recovery of $2,288,847, but that the factor would avoid abrupt changes in rates.

11. During the period under review, CP&L had sixteen (16) scheduled and/or forced outages at its four nuclear plants.[8] Through the pre-filed direct and rebuttal testimony submitted by CP&L witness Ronnie M. Coats, the Company asserted that each of the sixteen outages were prudently incurred. Nucor witness Samuel H. Hobbs, Jr., testified that eight of the sixteen outages were either

7. CP&L witness Bouldin updated his pre-filed testimony at the hearing and explained that CP&L had exercised its right to withdraw from its Schedule J contract with Duke.

8. Again, pursuant to the agreement of the parties in Docket No. 91-3-E, the Commission is considering the August 16, September 27, and October 12, 1990 outages at Brunswick Unit 2.

the result of or were extended by the unreasonable actions by the Company. Staff witnesses Gary E. Walsh and A. R. Watts testified that six of the sixteen outages were the result of or were extended by unreasonable actions of the Company. Although the Consumer Advocate did not offer any witnesses, after the hearing the Consumer Advocate submitted a brief which asserted that nine of the sixteen outages were the result of or were extended by unreasonable actions of the Company.

12. At the hearing, Company witness Coats amended his pre-filed testimony by stating that the Brunswick Unit 1 generator relay outage beginning on March 5, 1991, was caused by an unreasonable action of the Company. Additionally, Coats amended his pre-filed testimony by stating that the fires during the scheduled refueling outages at Brunswick Unit 1 and Robinson Unit 2 were the result of unreasonable actions by the Company. Coats testified that, except for these three situations, all other actions by the Company in regard to the cause or extension of the outages at its nuclear plants were reasonable.

13. Brunswick Unit 1 - Refueling Outage.

On September 27, 1990, Brunswick Unit 1 was removed from service for scheduled maintenance and refueling. The Company planned that the outage would last for 164 days, including a two week contingency. The Brunswick Unit 1 refueling lasted 154 days, four days longer than the original critical path duration and ten days less than the 164 day scheduled outage. Hearing Exhibit 18.

On December 3, 1990, a fire occurred in the personnel access airlock between the reactor building and the drywell. According to Nuclear Regulatory Commission (NRC) Information Notice No. 91-17 "[t]he fire was caused by the overheating of electrical cables from the combined effects of excessive current and insufficient heat dissipation." Hearing Exhibit 19. According to the Company's final outage report, the fire and subsequent cleanup after the fire placed the refueling outage two days behind its original critical path schedule. Hearing Exhibit 18.

On January 2, 1991, a fuel bundle was dropped when a momentary loss of power to the refueling grapple occurred. According to CP&L's Licensee Event Report (LER) 1-91-001, loss of power to the grapple occurred when the fuel bundle "encountered resistance with the adjacent central blade as it was being lowered" into the reactor core. Hearing Exhibit 20. As further stated in CP&L's Supplement to Licensee Event Report 1-91-001, the dropped fuel bundle "was caused by the reversing of the grapple assembly air lines and switch configuration at some point in time." Hearing Exhibit 20., p. 5. The Company's investigation did not reveal whether the grapple with the reversed hoses was delivered to CP&L in that condition or whether the switch and hoses may have been the result of plant maintenance activities. Hearing Exhibit 20. Coats testified that the Company could not have detected the condition of the air lines and hoses during vendor-recommended testing or routine operation and that "[t]he problem which caused the failure could only have been discovered under the unique set of

circumstances which occurred on January 2, 1991." Pre-filed rebuttal testimony p. 3. The dropped fuel assembly placed the Company two days behind its planned critical path schedule. Hobbs testified that whether the reversed hoses in the grapple arrived at CP&L in a defective condition or were the result of maintenance procedures, CP&L was responsible for the dropped fuel assembly.

14. Brunswick Unit 1 - Generator Relay Outage.

During a refueling outage, a generator relay was removed from service and taken off-site to be calibrated. After calibrating the generator relay, a CP&L technician failed to return the relay from the calibration mode to the operational mode. The generator relay was returned to Brunswick Unit 1. Upon being placed into service, the generator relay, set in the calibration mode, caused the nuclear reactor to scram on March 5, 1991. When CP&L attempted to restart the unit, one of the recirculation pump discharge valves would not open. CP&L replaced the valve's motor operator and the plant was returned to service on March 9th. The total duration of this outage was 3.63 days.

Company witness Coats testified that CP&L employee's action in failing to reset the generator relay to the operations mode was unreasonable. Nucor, the Consumer Advocate, and the Staff agreed that the Company's action in this instance was unreasonable.

15. Brunswick Units 1 and 2 - Diesel Generator Outage.

During cleaning and maintenance of its diesel generators, CP&L found metal particles located in diesel generator #1's lube oil strainer. To investigate the source of this debris, CP&L

personnel prepared a work request which instructed maintenance crews to "remove and replace all camshaft bearings.... removing everyother (sic) one until all bearings have been replaced" in accordance with the diesel generator technical manual and in accordance with the technical representative's instructions. Hearing Exhibit 7. This was the first time that Brunswick personnel had ever removed and replaced the camshaft bearings.

According to the testimony at the hearing, CP&L's day shift began removing every other bearing from the camshaft, cleaned the camshaft, barred over the engine, cleaned the exposed camshaft, and then replaced the bearing before removing another bearing. The day shift stationed a mechanic at each end of the camshaft during its rotation to detect problems. Due to its location next to the thrust collar, the day shift encountered difficulty in removing camshaft bearing #9 and contacted the technical representative who was on-site but was not overseeing the camshaft maintenance activities. The technical representative instructed the mechanics to remove bearing #8 in order to obtain access to bearing #9. The day shift removed bearings #8 and #9, rotated the camshaft, then left for the day. The night shift came on duty and also rotated the camshaft. The day shift had not informed the night shift to station a mechanic at the ends of the camshaft to detect if there were any problems.

In performing this cleaning and replacement of the bearings, diesel generator #1's right side camshaft was damaged and both

Brunswick Units 1 and 2 were placed into forced outages[9] on March 29, 1991. CP&L witness Coats testified that the damage to the camshaft occurred when bearings #8 and #9 were removed; he explained that removal of the adjacent bearings caused a slight deflection of the camshaft and that this deflection broke off the tip of a magnetic speed probe located in close proximity to the gears of the diesel generator. Coats stated that neither the technical representative nor the plant mechanics knew of the location of this speed probe. Coats testified that when the night shift mechanics rotated the camshaft with bearings #8 and #9 removed, the broken tip of the speed probe became lodged in the gearing and continued rotation led to wedging of the probe between the gears which caused additional deflection and the scoring of the camshaft on a bearing housing. Coats concluded that had it not been for the unknown location of the speed probe, the camshaft would not have been damaged. Coats testified that the technical representative's instructions to remove adjacent bearings #8 and #9 were reasonable in that the representative did not know of the location of the speed probe. Coats asserted that CP&L reasonably relied on the technical representative's instructions. Brunswick Unit 1 was returned to service on May 7, 1991, and Brunswick Unit 2 was returned to service on May 8, 1991.

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9. Because Brunswick was operating under a Limited Condition of Operation (LCO) which specified how long the plant could operate without all of its diesel generators in service, both Brunswick units were required to be shut down while the repairs to diesel generator #1 were made.

Nucor witness Hobbs testified that this outage was caused by damage to the diesel camshaft which was the result of the rotation of the camshaft with bearings #8 and #9 removed. Hobbs testified that the damage to the camshaft was the result of unreasonable personnel error. In addition, Hobbs testified that CP&L took unreasonable actions (1) by failing to thoroughly research and determine the correct procedure for removing and replacing the bearings and cleaning the camshaft, (2) by failing to draft sufficiently detailed work instructions, (3) by management failing to properly brief the technical representative on his role in the work process, (4) by the technical representative failing to recognize the potential for damage and by failing to communicate the proper procedure to remove bearing #9 to CP&L's mechanics, (5) by management failing to properly supervise the work procedure, (6) by personnel failing to adequately communicate with each other, (7) and by using inexperienced personnel on the night shift to rotate the camshaft.

Staff witness Walsh testified that when bearings #8 and #9 were removed, the camshaft was left without adequate support. Walsh testified that the inadequate support caused the camshaft to drop and break off the tip of the speed probe and that this tip became wedged in the gears which led to the scoring of the camshaft. Walsh testified that, in his opinion, the damage to the camshaft was caused by the unreasonable actions of CP&L personnel. In addition, Walsh stated that the Company's lack of detailed work instructions for the camshaft project was unreasonable.

Prior to the forced diesel generator outage CP&L had scheduled three weeks of required performance testing for June 1991, but had asked the NRC to waive the testing. When Brunswick Units 1 and 2 were down as a result of the diesel generator outage, CP&L conducted the performance test. On cross-examination, Walsh was asked whether any disallowance for the diesel generator outage should be reduced by the three weeks of performance testing conducted by CP&L during the outage. Walsh responded that on seven occasions other electric utilities had requested the NRC waive performance testing and that on each of these occasions the NRC had granted the waivers. Walsh stated that, based on this knowledge, it was likely that CP&L would have received a waiver of the June performance testing. Walsh explained that, in his opinion, the performance testing during the forced outage did not eliminate the need for a scheduled outage because it was unlikely the outage would have occurred in June and, therefore, the Commission should disallow the full extent of the diesel generator outage.

The NRC investigated the outage which resulted from damage to diesel generator #1's camshaft. In Inspection Report Nos. 50-325/91-06 and 50-324/91-06 the NRC stated as follows:

> The removal of the camshaft bearings on DG No. 1 and the subsequent barring of the engine was accomplished without a written and approved procedure. WR/JO[10] AFXP1 provided the work instructions for investigating the cause of the metallic particles in the lube oil strainer. This WR/JO did not specify the removal of adjacent bearings nor the provisions to bar over the engine. While it is recognized that there is some "skill of the craft" involved with these type repairs,

10. Work Request/Job Order.

> a procedure or detailed work instructions is required by the Technical Specifications and the licensee's administrative procedures. Since this evolution, removal of camshaft bearings, had not previously been performed by the licensee's staff, detailed instructions were even more important in this case. The failure to have a procedure for this work is a Violation: Failure To Perform Diesel Repairs With Approved Procedures, (325,324/91-06-02).

The NRC ultimately issued a Notice of Violation and imposed a civil penalty in the amount of $87,500 on CP&L.[11]

16. Brunswick Unit 2 - Fuse Outages.

In response to the NRC's new fire protection requirements known as "Appendix R," CP&L removed its Bussman Type MIN fuses from its feedwater level control system and replaced them with Gould-Shawmut fuses.[12] Instead of replacing the fuses, CP&L could have conducted a cable analysis to determine if its common power supplies were contained in the same breaker panel.[13]

On August 16, 1990, after being in operation for approximately 2½ years, a Gould-Shawmut fuse blew and caused Brunswick Unit 2 to scram. CP&L conducted an investigation of the fuse and could not determine the cause of its failure. Consequently, CP&L replaced the fuse with another Gould-Shawmut fuse. This outage lasted 2.52 days.

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11. The amount of the civil penalty was an aggregate charge for several violations.

12. Under certain conditions, Gould-Shawmut fuses fail faster than Bussman Type MIN fuses.

13. If the cable analysis had revealed that CP&L's common power supplies were in fact contained in the same breaker panel, no modification in the fuse type would have been needed to comply with Appendix R.

On August 19, 1990, CP&L experienced another outage, unrelated to the fuse, at Brunswick Unit 2.[14] On October 12, 1990, the reactor at Brunswick Unit 2 scrammed when a second Gould-Shawmut fuse failed. At that time CP&L conducted a cable analysis and determined that its common power supplies were located in the same breaker panels. Accordingly, CP&L decided to temporarily remove the Gould-Shawmut fuses and replace them with Bussman Type MIN fuses. The October 12th outage lasted 7.06 days. CP&L witness Coats testified that from an engineering standpoint both the Gould-Shawmut and Bussman Type MIN fuses were acceptable under the Appendix R requirements.

Nucor witness Hobbs testified that, in his opinion, CP&L was unreasonable in not conducting the cable analysis in 1988 prior to switching to the Gould-Shawmut fuses. Hobbs further testified that CP&L was also unreasonable in not conducting a cable analysis after the August 16th outage and that CP&L had ample time to evaluate the use of the Gould-Shawmut fuses during the August 19th outage. Hobbs admitted that he didn't know if a Bussman Type MIN fuse would have also failed in either the August or October 1990 outages. Hobbs agreed that the use of the Gould-Shawmut fuses complied with the Appendix R regulations.

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14. This outage is not the subject of review in this proceeding. This outage was considered in Docket No. 91-3-E and the Commission determined that CP&L should be allowed to recover the fuel replacement costs associated with the outage. The August 19 outage is only mentioned in this context because Nucor refers to this outage in its argument.

17. Brunswick Unit 2 - Voltage Regulator Outage.

On September 27, 1990, Brunswick Unit 2 experienced generator voltage oscillations which resulted in a loss of the main generator and, ultimately, a reactor scram.[15] The voltage regulator involved in this outage was placed in service in 1976. In 1979, a General Electric (GE) technical representative changed the setting on the automatic regulator. In 1983, GE issued Technical Information Letter No. 961 which recommended five control function changes to the voltage regulator, one of which was to change the regulator to the setting as the technical representative had done in 1979. The letter instructed that all five modifications should be implemented. CP&L did not undertake these proposed modifications. Following problems in 1985, a technical representative again adjusted the setting on the voltage regulator.[16] CP&L's LER stated that "the primary cause of the SCRAM was a voltage regulator that had become potentially unstable due to past improper adjustments." Hearing Exhibit 15, p. 1. In addition, Coats explained that because Brunswick Unit 1 was in a scheduled refueling at the time of the voltage oscillations, the system dispatcher was boosting the system voltage by switching in capacitor banks. The addition of the capacitor banks resulted in a voltage boost on the system, which the voltage regulator sensed and subsequently attempted to change the voltage on the generator to

15. This outage lasted 4.57 days.

16. Apparently, the voltage regulator was returned to its original setting in 1985.

maintain system compatibility. After this outage, CP&L revised the voltage regulator settings in accordance with Technical Information Letter No. 961. Coats testified that, even with this revision, the regulator continues to experience voltage oscillations.

Hobbs testified that the September 27, 1990, voltage regulator related outage resulted from imprudent actions on the part of CP&L. Hobbs contended CP&L knew there were problems with the stability of its voltage regulator and that the Company had the opportunity to correct these problems and prevent the outage.

18. Harris Unit 1 - Testing of Reactor Trip Switch Outage.

From March 16, 1991 through May 22, 1991, Harris Unit 1 was removed from service for a scheduled refueling. During maintenance activities, CP&L personnel used electrical jumpers to supply power for certain testing procedures. CP&L personnel failed to follow the Company's established procedures for use of electrical jumpers. Use of the electrical jumpers "caused a short and subsequent failure of a transistor on the under-voltage output card." Watts, Pre-filed testimony 5. The failed output card was not detected during post maintenance testing. On June 3, 1991, the plant experienced a reactor trip during a surveillance test due to a spurious reactor coolant low flow signal. During this scram, one of the reactor trip breakers did not operate as required due to a failed electronic circuit card. The circuit card was replaced and Harris Unit 1 was returned to service in 20 hours.

Additional investigation of the failed circuit card revealed that the card failure may have occurred during the March-May

refueling outage and that the required post maintenance testing after the work activity did not recognize the failed card. As stated by Company witness Coats, "[s]ince the validity of the post maintenance testing on the breaker was in question, it was necessary to declare the reactor trip switch inoperable pending further testing to confirm operability." Coats, Pre-filed testimony p. 4. Consequently, on June 8, 1991, Harris Unit 1 was taken out of service to conduct post maintenance testing to assure operability of the circuit card. The plant was out of service for 1.53 days, or 36.75 hours.

Staff witness Watts testified that, in his opinion, CP&L's actions in failing to follow proper procedure regarding breaker operations during the refueling outage and the subsequent forced outage for testing was unreasonable. Under cross-examination by the Company, CP&L suggested that it had altered its procedures for the use of electrical jumpers and that, under its new procedures, the Company's use of the electrical jumpers during the refueling outage would have been proper.

19. Robinson Unit 2 - Refueling Outage.

On September 8, 1990, Robinson Unit 2 was taken out of service to perform scheduled refueling and maintenance. Originally, the outage had a scheduled duration of 120 days with a minimum potential critical path of 99 days. Instead, the outage lasted 182 days.

Subsequent to the reactor head reassembly, the Company discovered one of the control rods was unlatched. The Company

found the unlatched control rod during the rod drop test, which was conducted with the vessel head in place and was the third and final test on the control rods. Company witness Coats testified as follows:

> "[t]he cause of the rod unlatching has not been determined. Appropriate procedures were in place and qualified personnel were employed.... Extensive reviews have been performed and we have found no evidence of a mechanical problem with equipment nor have any problems with the procedures for the installation been identified. Based on the investigations performed, it is my opinion that the event represents an isolated and unavoidable occurrence." Coats Pre-filed testimony pgs. 12-13.

Nucor witness Hobbs testified that, in his opinion, CP&L should be responsible for the fuel replacement costs of $5,625,000 associated with the unlatched control rod.[17] Hobbs testified that because CP&L determined the unlatched control rod was not the result of some mechanical failure, the most probable cause of the unlatched control rod was personnel error. Hobbs referred to CP&L memoranda which stated that Westinghouse had informed CP&L that "it is possible to 'partially latch' a RCCA [Rod Cluster Control Assembly] if the button is not fully depressed such that the drive would pass a drag test and other normal surveillance testing. Uncoupling would be incurred during subsequent drive motion utilizing installed equipment." Hearing Exhibit 25. Hobbs also explained that the unlatched control rod is the subject of a warranty claim by CP&L against Combustion Engineering, a contractor who performed portions of the refueling activity. Since CP&L

17. This amount is on CP&L's total system basis.

apparently contends the contractor's actions were unreasonable, Hobbs asserts that CP&L's actions were likewise unreasonable.

On February 14, 1991, a fire occurred in the reactor vessel head storage area. The cause of the fire was similar in nature to the fire during Brunswick Unit 1's refueling outage. See, Order pg. 8. CP&L admits that the Company's actions causing the fire were unreasonable. Company witness Coats testified that the cleanup from the fire extended the outage by 3½ days.

Staff witness Watts testified that, based upon his review of the log report from the refueling outage, the fire resulted in an unreasonable extension of the outage for 85½ hours. Watts determined that an 85½ hour extension resulted in additional fuel expenses of $99,882 on a South Carolina retail basis.

Nucor witness Hobbs testified that one document compiled by CP&L suggested the fire extended the outage by two days but that the final outage report, also compiled by CP&L, stated the fire extended the critical path by 175 hours. Hobbs recommended the Commission disallow fuel replacement costs for 175 hours.

20. Staff witness Walsh also offered testimony concerning Staff's investigation into the premium-penalty provisions in CP&L's contracts with General Electric for recirculation piping replacement activities at Brunswick Units 1 and 2.[18] Under these contractual provisions, General Electric would either receive a

18. Pursuant to Order No. 90-691 (October 18, 1990), in Docket No. 90-004-E, the Commission instructed the Staff to determine the appropriate accounting treatment for the premium-penalty provisions.

premium from CP&L for completing the recirculation piping work a certain number of days ahead of schedule or would pay CP&L a penalty if it completed the piping a certain number of days behind schedule. Walsh testified that Staff determined the premium-penalty payments were not fuel-cost related and that the premium-penalty payments should be capitalized. Walsh testified that these payments would be subject to review at CP&L's next rate case proceeding.

CONCLUSIONS OF LAW

1. Pursuant to S.C. Code Ann.§58-27-865(A)(Supp. 1990), each electric utility must submit to the Commission its estimated fuel costs for the next six months. Following an investigation of these estimates and after a public hearing, the Commission directs each electric utility to place in effect in its base rate an amount designed to recover, during the next six months, the fuel costs determined by the Commission to be appropriate for that period, adjusted for the over-recovery or under-recovery from the preceding six month period.

2. South Carolina Code Ann.§58-27-865(F) requires the Commission to allow electric utilities to recover "all of their prudently incurred fuel costs... in a manner that tends to assure public confidence and minimize abrupt changes in charges to customers."

3. South Carolina Code Ann.§58-25-865(E)(Supp. 1990) specifies as follows:

> The Commission shall disallow recovery of any fuel costs that it finds without just cause to be the result

> of failure of the utility to make every reasonable effort to minimize fuel costs or any decision of the utility resulting in unreasonable fuel costs, giving due regard to reliability of service, economical generation mix, generating experience of comparable facilities, and minimization of the total cost of providing service.

4. As stated by our Supreme Court in Hamm v. South Carolina Public Service Commission, 291 S.C. 178, 352 S.E.2d 476, 478 (1987), Section 58-27-865(E) requires the Commission "to evaluate the conduct of the utility in making the decisions which resulted in the higher fuel costs. If the utility has acted unreasonable, and higher fuel costs are incurred as a result, the utility should not be permitted to pass along the higher fuel costs to its customers." "[T]he rule does not require the utility to show that its conduct was free from human error; rather it must show it took reasonable steps to safeguard against error." Id. at 478, citing Virginia Electric & Power Co. v. Division of Consumer Counsel, 220 Va. 930, 265 S.E.2d 697 (1980). By Order Nos. 91-636 (August 6, 1991) and 91-762 (September 6, 1991), this Commission specifically ruled that it would apply negligence principles to its determination of whether an electric utility's actions in regard to fuel costs were either reasonable or unreasonable.

5. The major advantage of producing electricity by nuclear power is the relatively low fuel cost for nuclear fueled generating facilities. The cost of generation of electricity is generally composed of costs such as capital, interest, taxes, insurance, operating and maintenance (O&M) costs, and fuel costs. For fossil fueled plants, the cost of the fuel is a larger portion of the

total cost to generate electricity. For nuclear power plants, while the capital and O&M costs are higher compared to fossil fueled plants, the fuel costs are comparatively low. Thus, if the electricity generated by a nuclear plant must be replaced by electricity by a coal or gas fired plant, the Company incurs higher fuel costs. This difference between the fuel cost to generate a quantity of electricity by fossil fuel and the fuel cost to generate the electricity by nuclear fuel is the excess replacement fuel cost.

6. Brunswick Unit 2 - Fuse Outages.

The Commission concludes that CP&L should be allowed to recover the excess fuel replacement costs associated with the Brunswick Unit 2 fuse outages. The Commission finds that, while arguably unnecessary, the substitution of the Gould-Shawmut fuses for the Bussman Type MIN fuses in 1988 was consistent with good engineering practice and was acceptable under Appendix R modifications. Moreover, the Commission finds that there was no evidence that had the Bussman Type MIN fuses been in place in August and October 1990 instead of the Gould-Shawmut fuses, they would not have failed and would have prevented the two outages. Accordingly, the Commission finds that CP&L did not undertake any unreasonable actions which would subject it to a disallowance for these outages.

7. Brunswick Unit 2 - Voltage Regulator Outage.

The Commission concludes that CP&L should be allowed to recover the excess fuel replacement costs associated with the

Brunswick Unit 2 voltage regulator outage. Although technical representatives may have recommended numerous adjustments to the voltage regulator, the Commission concludes it is unlikely that adjustments to the voltage regulator settings would have prevented the September 27, 1990 outage. The Commission finds that the most persuasive evidence indicates that the outage was the result of a combination of unusual factors, as described by witness Coats, occurring on September 27. The testimony indicates that although the voltage regulator experienced oscillations since 1985, the regulator's settings did not cause an outage for five years. Moreover, since the September 1990 outage, even though CP&L has adjusted the voltage regulator in accordance with the Technical Information Letter No. 961's specifications the regulator continues to experience oscillations. Accordingly, the Commission finds that, based on all the evidence presented, CP&L's actions in regard to the voltage regulator were reasonable.

8. Brunswick Unit 1 - Refueling Outage.

The Commission also concludes that CP&L should be allowed to recover the fuel costs associated with the dropped fuel bundle at Brunswick Unit 1 during the scheduled refueling outage. The Commission is persuaded that Company personnel could not have discovered the reversed hoses in the refueling grapple through routine testing or operation. Accordingly, the Commission concludes that the actions taken by CP&L in regard to the refueling grapple were reasonable and, therefore, the Company should be allowed to recover the excess fuel replacement costs associated

with the refueling grapple repairs during the Brunswick Unit 1 refueling outage.

On the other hand, the Commission concludes that CP&L should not be able to recover the fuel costs associated with the fire at Brunswick Unit 1 during the scheduled refueling outage. CP&L has conceded that the cause of the fire, and the subsequent two day extension of the critical path, was the result of unreasonable actions on the part of Company personnel. Therefore, the Commission disallows fuel replacement costs for two days for this outage in an amount of $48,374.

9. Brunswick Unit 1 - Generator Relay Outage.

The Commission concludes CP&L should not be permitted to recover the fuel costs associated with the full extent of the Brunswick Unit 1 generator relay outage. First, CP&L has conceded that the generator relay outage was caused by unreasonable actions on the part of its personnel. Second, the only evidence in the record regarding the length of the outage indicates that when CP&L attempted to restart the unit, one of the recirculation pump discharge valves would not open. Repair of the valve was necessary before the plant could be returned to service. Therefore, the Commission disallows fuel replacement costs of 3.63 days for this outage. See Order Nos. 91-636 and 91-762, citing Greenville Memorial Auditorium v. Martin, ___S.C.___, 391 S.E.2d 546 (1990).

10. Brunswick Units 1 and 2 - Diesel Generator Outage.

The Commission concludes that the diesel generator outages at Brunswick Units 1 and 2 were caused by unreasonable

actions on the part of CP&L. Although the specific cause of the damage to diesel generator #1's right camshaft is subject to dispute, the Commission concludes that the maintenance crew's decision to remove adjacent bearings #8 and #9, in spite of work order instructions which specified to remove every other bearing, was unreasonable. CP&L personnel knew that work on the camshaft could cause it to deflect and were stationed at the camshaft's ends to detect any deflection. The Commission concludes that CP&L personnel working on the camshaft project either knew or should have known that removal of two adjacent bearings would have reduced the support to the camshaft or, at the very least, that the work order specified removal of every other bearing for some reason.

The Commission further concludes that the maintenance crew's reliance on the technical representative's suggestion to remove adjacent bearings #8 and #9 does not relieve the Company of its decision to remove the adjacent bearings. Our Supreme Court has already stated that "a utility cannot insulate itself from responsibility... by delegating decision-making authority to a third party." Hamm, id. at 478.

Finally, the Commission concludes that the total length of the outages, 39.04 days at Brunswick Unit 1 and 40.59 days at Brunswick Unit 2 should be disallowed. While CP&L had not yet heard from the NRC on its request to waive the performance testing scheduled for June 1991 and decided to conduct the testing during the outages, the Commission is not convinced that by conducting the performance tests during the diesel generator outages CP&L eliminated the need

for a future outage in June. The Commission finds witness Walsh's testimony that CP&L would have most likely received a waiver because of the NRC's record on waiver requests persuasive.

11. Harris Unit 1 - Testing of Reactor Trip Switch Outage.

The Commission concludes that CP&L should not recover the excess fuel replacement costs associated with the Harris Unit 1 reactor trip switch outage. The Commission finds that the Company's failure to follow its own established procedures for use of electrical jumper cables was unreasonable. Further, as recognized by Company witness Coats, the reliability of CP&L's post maintenance testing was questioned after testing failed to discover the failed breaker card.[19] Accordingly, because the actions of the Company were unreasonable and these actions necessitated an unscheduled outage to conduct post maintenance testing, the Commission concludes that the Company should not recover the fuel replacement costs associated with this outage. Moreover, even assuming CP&L has revised its procedures for the use of jumper cables, as suggested by counsel for the Company, the Commission still finds that CP&L acted unreasonably in May 1991 by failing to follow the then established procedures which resulted in an unscheduled outage for post maintenance testing.

12. Robinson Unit 2 - Refueling Outage.

The Commission concludes that CP&L should not be able to

19. In actuality, the post maintenance testing team had not been informed that electrical jumpers had been used and, therefore, did not conduct tests to assure that the circuitry was operating properly.

recover the excess fuel replacement costs associated with the fire which occurred during the refueling outage at Robinson Unit 2. The Company has conceded that its actions in regard to the cause of the fire were unreasonable. While there is some dispute as to the length of time during which the fire and subsequent cleanup activities extended the critical path, the Commission finds witness Watts' recommendation that the fire extended the outage for 85½ hours the most persuasive. Because of the inconsistencies in CP&L's own documentation, the Commission finds that Watts' tracing of the extension of the outage associated with the fire through the log report convincing and, accordingly, accepts the 85½ hour extension for purposes of this disallowance.

The Commission further concludes that CP&L should not be permitted to recover the fuel replacement costs associated with the unlatched control rod during the Robinson Unit 2 refueling. The Company's own witness testified that CP&L determined that the unlatched control rod was not the result of a mechanical failure. Lack of a mechanical failure suggests the unlatched control rod was the result of personnel error. Moreover, CP&L's internal memoranda concerning discussions with Westinghouse and Combustion Engineering indicates that the Company is of the opinion that unreasonable personnel error on the part of its contractor Combustion Engineering most probably caused the unlatching of the control rod. Accordingly, the Commission is not persuaded that the actions of CP&L were reasonable in regard to the unlatched control rod and disallows the associated recovery costs for the unlatched control

rod.[20]

13. After considering the directives of Section 58-27-865(A) and (F) which require it to place in effect a base fuel cost which allows the Company to recover its fuel costs for the next six months, adjusted for the over-recovery or under-recovery from the preceding six month period, in a manner which assures public confidence and minimizes abrupt changes in charges, the Commission has determined that the appropriate base fuel factor for October 1991 through March 1992 is 1.375 cents per kilowatt-hour.[21] The Commission finds that a 1.375 cent fuel component will allow CP&L to recover its projected fuel costs. At the same time, this component will prevent abrupt changes in charges to CP&L's customers.

14. The Commission has considered Nucor's recommendation that it limit consideration of the nuclear prudence issues to every other six month proceeding. While the Commission recognizes some merit in this recommendation, it has determined that such a change would be too burdensome for all parties involved. Accordingly, the

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20. The Commission has disallowed $843,638 for the unlatched control rod. This amount is based on Hobbs' testimony that CP&L had stated that $5,625,000 (on a system basis) was the replacement power cost. Hobbs' Pre-filed testimony, p. 33. It is unclear how this $5,625,000 figure was calculated and whether it was based on the Company's previous or revised MDCs.

21. The Commission has increased the Company's projected fuel costs by $73,120 to reflect the increased costs due to the elimination of the Duke Schedule J purchase. Since CP&L agreed that it had intended to withdraw from the Duke contract, the Commission finds that the projected fuel costs should be adjusted to reflect this notification.

Commission denies this recommendation.

15. Finally, the Commission has considered Staff's proposed accounting treatment of the premium-penalty payments included in its recirculation piping contracts with GE. The Commission concurs with Staff's recommendation and concludes that the premium-penalty payments are not fuel-cost related and should be capitalized. The Commission notes that questions concerning the propriety of the contractual provisions or specific accounting treatment of the payments may be raised at the Company's next ratemaking proceeding.

IT IS THEREFORE ORDERED THAT:

1. The base fuel factor for the period October 1991 through March 1992 is set at 1.375 cents per kilowatt-hour.

2. Within ten (10) days of the date of this Order, CP&L shall file with the Commission for its approval, rate schedules designed to incorporate the findings herein and an adjustment for fuel costs as demonstrated by Appendix A.

3. That allowable fuel expense for the period April 1991 through September 1991 shall be reduced by $3,179,001[22] because of

22. Except for fuel costs associated with the unlatched control rod, this figure is based on the Company's revised MDCs, which results in a positive adjustment to the South Carolina Retail Cumulative Recovery Account. The adjustment is a calculation of the length of the disallowed outages, multiplied by a capacity factor of 85% which was approved by the Commission in Order No. 90-961 (Oct. 19, 1990), in Docket No. 90-4-E, adjusted for Power Agency Ownership, where applicable, and multiplied by the cost difference between nuclear fuel, when available, at the unit where the outage occurred (when not available, Staff used the nuclear fuel cost for the next month which was indicative of actual fuel expense) and average fossil fuel for the month of the outage. Thereafter, the South Carolina retail energy allocation factor was applied.

the unreasonable actions of the Company as explained by this Order.

4. CP&L shall fully respond to discovery from all parties and from the Commission Staff in an open and expeditious manner in all proceedings before this Commission.

BY ORDER OF THE COMMISSION:

Marjorie Amos-Frazier
Chairman

ATTEST:

Charles W. Ballentine
Executive Director

(SEAL)

Carolina Power and Light
Adjustment for Fuel Costs

APPLICABILITY

This adjustment is applicable to and is a part of the Utility's South Carolina retail electric rate schedules.

The Public Service Commission has determined that the costs of fuel in an amount to the nearest one-thousandth of a cent, as determined by the following formula, will be included in the base rates to the extent determined reasonable and proper by the Commission for the succeeding six months or shorter period:

$$F = \frac{E}{S} + \frac{G}{S_1}$$

Where:

F= Fuel cost per Kilowatt-hour included in base rate, rounded to the nearest one-thousandth of a cent.

E= Total projected system fuel costs:

(A) Fuel consumed in the Utility's own plants and the Utility's share of fuel consumed in jointly owned or leased plants. The cost of fossil fuel shall include no items other than those listed in Account 151 of the Commission's Uniform System of Accounts for Public Utilities and Licensees. The cost of nuclear fuel shall be that as shown in Account 518 excluding rental payments on leased nuclear fuel and except that, if Account 518 also contains any expense for fossil fuel which has already been included in the cost of fossil fuel, it shall be deducted from this account.

PLUS

(B) Purchased power fuel costs such as those incurred in unit power and Limited Term power purchases where the fuel costs associated with energy purchased are identifiable and are identified in the billing statement.

PLUS

(C) Interchange power fuel costs such as Short Term, Economy, and other where the energy is purchased on economic dispatch basis.

Energy receipts that do not involve money payments such as Diversity energy and payback of storage energy are not defined as purchased or interchange power relative to this fuel calculation.

MINUS

(D) The cost of fuel recovered through intersystem sales including the fuel costs related to economy energy sales and other energy sold on an economic dispatch basis.

Energy deliveries that do not involve billing transactions such as Diversity energy and payback of storage are not defined as sales relative to this fuel calculation.

S = Projected system kilowatt-hour sales excluding any intersystem sales.

G = Cumulative difference between jurisdictional fuel revenues billed and fuel expenses at the end of the month preceding the projected period utilized in E and S.

S_1 = Projected jurisdictional kilowatt-hour sales for the period covered by the fuel costs included in E.

The appropriate revenue related tax factor is to be included in these calculations.

The fuel costs (F) as determined by South Carolina Public Service Commission's Order No. 91-819 for the period October 1991 through March 1992 is 1.375 cents per kilowatt-hour.